SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1771.—Vol. XXXIX. LONDON, SATURDAY, JULY 31, 1869. {STAMPED .. SIXPENCE. UNSTAMPED, FIVEPENCE.

ON SLATE AND SLATE QUARRIES.

BY S. R. PATTISON, F.G.S.

Chapter I.—Composition and Structure.

Slate is principally silicate of alumina, with iron and alkalies, mixed with quartz. Dr. Bischoff gives the analysis of various specimens: we select two, of greyish-black colour, from different localities, both being of the kind popularly termed good slates:—

	No. 1—From Bondorf.	No. 2—From Lestein.
Silica	62·59	64·58
Alumina	16·88	17·10
Protoxide of iron	8·42	7·43
Lime	0·24	0·16
Magnesia	2·26	2·29
Potash	3·31	2·93
Oxide of copper	0·13	0·30
Carbonate of lime	1·22	0·53
Water	4·03	4·08
Carbon and loss	0·92	0·60

The same chemist gives the analysis of thirty-six specimens, all slightly varying in the proportions of their contents, but all predominating in silica, alumina, iron, and alkali. Green slates contain a large proportion of iron. The average specific gravity of slate is 2·4 to 2·7 per cubic inch—about 1½ oz. Its ordinary composition is as follows:—

Silex	48 to 60
Alumina	23 to 5
Magnesia	1 to 6
Oxide of iron	11 to 3
Oxide of manganese	A trace to 5
Potash	4 to 7
Carbon	A trace to 3
Water	7 to 6

The common occurrence of what is called riband-slate throws considerable light on the original condition and structure of the rock. It is the proof of original sedimentary deposition under the influence of present laws. Mr. Sorby, who has investigated this subject with his usual success, sums up the result as follows:—

1.—The existence of ripple-drift proves that the material from which the schists were formed was mechanically deposited in water.

2.—This material originally constituted grains of sand, and was probably a deposit of more or less pure sand and clay.

3.—Whatever may have been their original nature, the present highly crystallised structure of the schists was developed after deposition; in some cases, indeed, after mechanical movements had produced complicated contortions, and given rise to slaty cleavage.

4.—The bands of different minerals represent the planes of original deposition, rendered very distinct by the alteration of thin strata (which in unaltered rocks often differ more in chemical composition than in appearance) into layers of minerals having entirely different mineral character.*

It is difficult to avoid all speculation on the origin of things when we are prying into the first steps of the order in which they now appear. We trace back the mode and condition of physical materials, but we are still at an infinite distance from their origin.

Assuming that elements were first created, and that from them were elaborated alkalies, lime, magnesia, silica, and alumina, the action of the gases and water would give rise to chlorides and sulphides, with separation of silica, and the accumulation of the atmospheric waters would form a sea charged with salts of soda, lime, and magnesia. The subsequent decomposition of exposed surfaces of the earth's crust, under the influence of water and carbonic acid, would transform the felspathic portions into a silicate of alumina (clay-slate), on the one hand, and alkaline bi-carbonate, the source of limestone, on the other.† The vast series of argillaceous strata now on the earth would appear, therefore, to have been formed by the decomposition of the felspathic minerals which constitute the lowest known rocks.

These riband markings occur not only in the lines of original bedding, but are sometimes the result of slopes or hollows in the beach, which become filled with materials drifted in, so as to lie at a different angle to that of the entire bed. Such work may be seen going on continually on any sandy shore, especially where there is a periodical influx of mud, or small runlets of fresh water; indeed, all the phenomena of structure and stratification in slate (not the cleavage or joints) are repeated on the margin of the present waters. The Indus, for instance, is constantly carrying down vast quantities of fine mud, held in suspension, which, by its deposit, becomes a floor, capable, under pressure and metamorphism, of furnishing a slate-bed for future times. The present is linked to the past by a continuous chain of natural phenomena, though the effects produced in the latter appear to have been far more considerable in equal times than the results we now witness in progress.

With regard to the light which the minute structure of slate throws on its origin, Prof. Bischoff says—"There is no doubt as to the purely sedimentary origin of primitive clay-slate. The presence in it of a silicate of lime and magnesia would be evidence of the existence of those substances in the sea-water from which it was deposited." The minute particles of slate are not crystalline in their form, but are like sea-sand; in fact, slate is precipitated mud. In good slate, such as that of North Wales, there may be seen mica, a portion of decomposed felspar, grains of quartz sand, and phosphate of iron. The colouring matter is iron in the form of minute crystals. The iron exists in the state of a peroxide in the reddish varieties. The black are coloured by pyrites. There is every gradation of composition, and much depends on the proportions, but more on the treatment to which the mass has been subjected. The particular hue is derived from the presence of substances which in the original sea or river sediment had the property of effecting the reduction of the persilicates of iron, an effect which would have been produced by the presence of animal or vegetable matters. It may be that the green colour of some of the older slates is the memorial left of the earliest life on the globe. The green or pale spots are fine clayey portions, with less iron than the surrounding mass. They were lumps of fine white material, which have been cut through by the cleavage forces, forming a spot the diminishing size of which in successive slates shows the size and form of the original lump. The parallel stripes or shades of colour, so often seen both in the face of quarries and in single slates, are, as before observed, marks of original deposition, arising from varying materials or conditions. Pressure and cleavage have obliterated the original divisions, leaving only the colour to mark their former existence. These marks appear, as is well known, on the surface of manufactured slates. The riband-slates, or striped slates, do not command the first price in the market, on account of some remaining tendency to break in the direction of the stripe, the original line of separation. The joints in slate-rocks are of use in forming a smooth face, and so aiding the extraction of large blocks uninjured; but when the joints are numerous and complicated, so as to reduce the mass of slate into an aggregate of pieces of less size than slates, they are, of course, damaging and fatal to the value of the rock.

* Quarterly Journal Geological Society, vol. 9, p. 406.
† Sterry Hunt, Quarterly Journal, vol. 15, p. 488.

The most frequent interruption in slate veins is the occurrence of a hard refractory bed of greenstone, or trappean matter, or mere siliceous grit, termed a "harda" or "post," which interrupts the cleavage, and distorts the structure for some space on each side, generally accompanied with the giving off of small quartz veins; the result being not only a barren portion of material through the quarry for the space affected, but the introduction of an element of uncertainty, for these hard runs of matter frequently enlarge, and spoil many yards of rock, and sometimes make the difference in working between profit without them and loss with them. They occur as constantly as the slate itself, and are well known in every quarry.

The groundwork of our scientific knowledge regarding the structure of slate was laid by Prof. Sedgwick, in his "Remarks on the Structure of large Mineral Masses, and especially on Chemical Changes produced in the Aggregation of Stratified Rocks during different Periods after their Deposition," published in the Transactions of the Royal Geological Society of London, in the year 1835. It had previously been observed by Mr. Bakewell ("Introduction to Geology," p. 103), and by Dr. Macculloch, in his "Description of the Western Islands of Scotland" (vol. 3, plate 22, fig. 6), that the divisional lines of slate are different to those of the bedding of the rock; but the Cambridge philosopher was the first to define and accurately describe the phenomena, so as to bring the facts into scientific order for practical use. A glance at any slate quarry discloses different systems of lines; one set are usually vertical to the run of the strata, and are neither strictly parallel or equidistant—they are smooth-sided actual divisions, and are termed the joints. They cut up the mass into irregular angular columns and wedges. Jointed surfaces are useful for building purposes, but are wholly inapplicable either for flagstones or slates. Another set of lines are observable, parallel to each other, dividing the mass into layers, often accompanied by slight changes in colour. These indicate lines of bedding, or original deposition of the materials. The top of each layer, when exposed, shows by the traces of ripple-marks or smooth hollows, and sometimes by occurrence of organic remains, that these once formed true upper surfaces. When a piece of such a layer is broken off it is a flagstone, not, commercially speaking, a slate.

On getting close to the face of the rock, we may notice that the blocks of rock removed by the aid of the jointing and bedding break in a direction slightly varying from the latter. This third plane of fracture is cleavage—a tendency to split in a uniform, even direction, at equal distances. The line of splitting is not coincident with either of the other two lines; it is more persistent and uniform in its parallelism than either; it lies at an angle averaging one in three from the line of bedding, strictly the same in any one quarry, but usually varying in different districts. In some places it is coincident with the bedding, in others it makes an angle of 40°. Whatever is the angle of cleavage it runs the same throughout the whole mass of rock exposed, even though its materials may be different, irrespective of bedding, irrespective of joints, irrespective of flexures and folds in the strata, irrespective of the irregularities of the surface. For instance, beds of impure limestone and coarse slate, with abundant shells, are seen in a gorge on the west side of Moel Faur, about two miles from Llanrhaidar, in North Wales; the beds dip to the S.E., at an angle of about 25°, but the cleavage of the slates—*i.e.*, the dip of the cleavage planes—is nearly north-west, at an angle of 48°. The limestone beds break most freely in the direction of the cleavage lines. Whatever cleavage force was, therefore, it was propagated through the limestone as well as the slate.*

Cleavage was so confidently mistaken for stratification by Saussure and older observers that the notion that the modern strata at the foot of the Alps plunged beneath the more ancient formations there was constantly maintained; indeed, it was a necessary consequence of the imperfect observation which had adopted the slaty structure as the effect of original deposition. Mr. Poulett Scrope attributes the phenomena of slaty cleavage to the influence of extreme pressure, occasioning internal movements and mutual friction in the particles of the solid mass, under which they became re-arranged, so as to produce lamination. He supposes these forces to have been brought into play by the same force which has bent, contorted, and elevated the beds.† Mr. Sorby, who has investigated the structure of slate with the microscope, has found that cleavage is just the result of pressure, that when the materals are fine and uniform there will be fine cleavage, because there has been uniform yielding to the pressure, and consequent uniform re-arrangement; but when the materials are coarse there will be imperfect cleavage, as the substance will pucker, and become folded, and not cleaved. He describes appearances in slate recks, which include coarse beds, to be analogous to what occurs when a strip of paper is included in a mass of some soft material, and the whole compressed in the direction of the slip of paper; the paper would be bent into contortions, whilst the plaster material would readily change its dimensions. A close examination of the structure evidences that there has been pressure in a line perpendicular to the cleavage, which has produced elongation in the line of cleavage dip. He calculates that in the fine-grained slates the condensation from pressure has been equal to one-half of the original volume.

Mr. Sorby encounters the difficulty of those who ask how such things can be by affirming that the facts are so. Perhaps it may be said—How is it possible that hard rocks could have had their dimensions changed to the extent described? To this I would reply—If the rocks be examined it will be seen that it really has occurred; and I would suggest that solidity is but a comparative property, and that the intensity of the forces in action during the elevation of a range of mountains could gradually change the dimensions of rocks, for it is well known that many hard and brittle substances will admit of such movements, as, for instance, the ice of glaciers and hard and brittle pitch.‡

Prof. Hausmann, of Gottingen, has collected instances showing the effect of long-continued heat in changing the molecular condition of solid bodies into laminated structure, without change of externa form. Prof. Tyndall, in lecturing at the Royal Institution, exhibit proof that cleavage may be produced by mere lateral pressure. H causes a lump of fine white wax to be compressed at its two side until perfect cleavage structure is produced, and it flakes off in plate like slate. The wax is kneaded together with the fingers, and then placed between plates of wetted glass. In this state it has no divisional planes—no grain. But pressure induces a re-arrangement, and it becomes separable in plates, with small flakes clinging to the surfaces, just like slates when split from the block.

* Quarterly Journal Geological Society, vol. 12, p. 347, and vol. 15, p. 84.
† Id., p. 476.
‡ Sorby, Origin of Slaty Cleavage. Edinburgh New Philosophical Journal, 1853.

When rocks, originally sedimentary, are crystallised in the mass, the lines of original deposition are called foliations. The lines of bedding, or foliation, are, of course, the most ancient; joints next, though the jointing process has been continued down almost to the present day, inasmuch as any contraction or removal of pressure, or drying operation, will still produce them. Cleavage is of several epochs, all subsequent, of course, to perfect consolidation. Prof. Ramsay says that there was a first and strongest cleavage in the Cambrian, Lingula, and Tremadoc slates, before the deposition of the Upper Silurian; then a second and more partial cleavage, well marked around Llangollen.

One of the most remarkable instances of intense cleavage is recorded by Prof. Ramsay (North Wales, p. 145) as occurring in a conglomerate on the north of Llyn Padara. Part of the conglomerate "consists of slaty pebbles, in a slaty matrix, the whole being affected by slaty cleavage, remarkable on account of the pebbles being elongated in the direction of the cleavage lines, and obliquely to the planes of bedding, in accordance with which, under ordinary circumstances, the flat side of the pebbles would naturally lie, this arrangement being due to intense pressure, which, in all cases of slaty cleavage, caused the particles composing the rock to arrange themselves approximately at right-angles to the direction of the force."

It will be seen from the description of the strata in which slate veins occur, that they have been subjected to ruder changes than metamorphism. There have been elevatory forces and depressing forces brought into play, of a magnitude almost inconceivable. There have been granite and trappean outbursts, rending the whole series; there have been more numerous instances of subterranean forces which have lifted the whole area into domes, or depressed it into basins, by deprivation of support. The result of the whole has been as we see it—a state of things sufficiently irregular to display all the wealth of the earth's crust, and yet sufficiently orderly to enable it to be worked scientifically and economically. Some amount of trappean matter appears to be essential to the production of good slate, but greenstone dykes actually destroy the cleavage of rocks in which they occur. They convert the slate into a hard porcellanic silicious rock; or, according to its constituents, degrade it into an incoherent decomposing substance.

Metamorphism.—It is proved by various lines of evidence—for instance, by the condition of organic remains, by tracing chemical changes, and by following extensions of strata from one condition to another,—that most of the older rocks have undergone chemical action since their original deposition. The action has metamorphosed them in composition and appearance. Metamorphism is not, therefore, so much a term of classification as a statement of condition, common to nearly every class of rock, but most conspicuously displayed in the old rocks with which slate is associated. The term metamorphic, when used as a term of classification, denotes stratified crystalline rocks, which although resulting, so far as regards their present strata, from chemical forces, were yet originally mere mud or sand deposits. In some cases, as in that of the dolomites, the stratification is entirely obliterated. Metamorphism has been effected in one of two ways. In some cases by heat, by contact with igneous molten matter, hot gases, or steam; or in the cold and moist way, by gradual chemical changes in the constituents of the rocks themselves. Perhaps no sedimentary substance which now forms the solid crust of the earth remains in the condition in which it was first deposited. The forces of heat, led on by direct transmission from another source, or generated by chemical action, the action of heated steam and vapours, the slow re-arrangements of solid bodies packed within reach of each other, the sliding effect of pressure, the development whenever inferior resistance permitted of crystalline forms—all these and other agencies, acting under invincible law, have modified the original sediments so as to produce the useful material we now possess.

Coal in India.—There has been a great discovery of coal in the central provinces. The district of Chanda lies due south of Nagpore, between that and the River Wurdah, which forms the northern boundary of Hyderabad. For some years Capt. Lucie Smith, the deputy-commissioner, has been boring for coal, and Mr. Mark Fryar, the practical geologist sent out lately to report on our coal resources, has more than confirmed his estimate of the value of his discoveries. Mr. Morris, the officiating chief commissioner, has written with great caution on the subject, until Messrs. Mather and Platt's steam borer, which has been sent for, arrives. But ordinary borings, and the opinions of Mr. Medlicott, geological surveyor, Mr. Bonner, C.E., and Mr. Fryar, reveal a vast thick and uniform deposit of coal, which has led the last to urge Government to begin mining operations at once, and to make a branch railway to the main Great India Peninsula line. The sandstones of the Chanda basin are the same as the well-known coal-bearing sandstones of Raneegunge, to which, indeed, Mr. Fryar compares the deposit in value and extent; he is confident that there are at least two square miles of coal, 14 ft. thick, at a depth of 300 ft., and in easy working position, on the Chanda side of the Wurdah, while there is a certainty of more than the same area on the other side. This practical and cautious Government geologist declares that the coal can be laid down by branch railway at Nagpore at 1*l.* a ton, giving a profit of 10s., while a ton of English coal costs 1*l.* 16s. at Bombay, and double that at Nagpore. If we so far discredit the Chanda coal as to say a ton of it is equal to only half a ton of English coal, it will still have 16s. in its favour at Nagpore. All India at present turns out 600,000 tons of coal a year, not more than the produce of one good colliery in England, and the two square miles of Chanda coal would give the same supply for thirty years. Labour is abundant, and the mines would prove a boon to a poor population. This is not all. The finest, if not the largest, cotton mart in India lies between Chanda and the main line of railway—that is Hingunghat, the cotton of which is so good that its seed is being introduced wherever the Sea Island and Egyptian varieties do not suit the inland climate. The Chanda coal field is to the south

of Hingunghat, and to the north of the finest cotton districts of Hyderabad. Cross the Wurdah to the south and you come to Edulabad, the cotton of which is so good that an English merchant has just laid out 10,000*l*. there, intending to send the produce down the river Godavery, of which the Wurdah is the main affluent, to Coconada. A branch line for the cotton alone was long ago projected to Hingunghat. Now there is the coal. If even half of Mr. Fryar's expectations are realised, the least known part of India will be opened up, and the feudatory provinces of the Nizam, who will be a minor for the next 14 years, will be enriched, while they are made to contribute their wealth of cotton and coal to the general good. Ultimately the line must be continued due south to Hyderabad, the capital, which is to be connected to the westward also with the Madras line to Bombay.

LEAD MINING IN WALES AND THE NORTH OF ENGLAND.

[FROM OUR SPECIAL CORRESPONDENT.]

One would not unnaturally suppose that the discovery of great metallic wealth was the most unalloyed benefit that could befal a country, for there a treasure is gained from Nature herself with an amount of labour quite disproportionate to its value to mankind. When new countries are opened out to agricultural labour, it requires at least a couple of generations of weary toil and self-denial before any surplus wealth can begin to accumulate; but the metallic discoveries of modern days operate changes, and bring about a growth of wealth, as rapid as any imagined by romancers. A few years ago—so few that to me it seems almost like yesterday—the Comstock vein had not been trodden by the foot of a white man, and now it has returned metallic ores to the value of about 20,000,000*l*. sterling, and been the means of spreading population and civilisation through countries which otherwise must have remained deserts for another century. It is the same in our own country, where the remotest wilds of Wales, Yorkshire, Cumberland, and Cornwall have been suddenly transformed by metalliferous discoveries into busy scenes of industry, comfort, and wealth. Yet such is the perversity of human nature, that metallic discoveries, which ought to have been the source of unalloyed prosperity, have not unfrequently been, on the contrary, the means of inflicting great losses and great misery. A great mine is suddenly discovered, which gives rise to a wild excitement, leading to the senseless and indiscriminate expenditure in its neighbourhood of sums of money probably exceeding in the aggregate all the profits obtained from it. An important metalliferous discovery in any district is a just and proper incentive to a vigorous exploration of that district; but experience, unfortunately, shows us that, with a few rare exceptions, very great metalliferous deposits are generally isolated, and are far from indicating that the neighbourhood around them will be found equally productive of metallic wealth. I might readily fill many pages of the Journal with instances of this which have occurred in various parts of the world, but my present purpose will be sufficiently served by recalling to the minds of your readers a few instances which must be familiar to the majority of them.

First and foremost stands Devon Consols, in the neighbourhood of which after its discovery scores of mines were started, and an incredible expenditure incurred, without a single serious success worth mentioning. Going west across the Tamar, the Devon Consols lode seems to multiply itself, for on the Cornish side of the river numerous lodes have been opened on through a great width of ground, from north to south, each claiming to be the veritable Wheal Maria lode. Now, although most of these lodes were highly promising, and only separated by a stream from the greatest copper mine in Europe, and although during 20 years large sums of money under various and most experienced managers have been expended on them, in no case has any success resulted. Eastward, if possible, the failure has been still more astounding. The original Devon Consols sett had an extent of about two miles on the course of the lode, from the Tamar to the turnpike-road; and close up to this turnpike-road, in Wheal Emma Mine (the easternmost of the mines forming Devon Consols), rich courses of ore were met with. About 10 years ago, on the renewal of the lease, it was considered to be of the utmost importance to acquire the ground east of this road, into which a course of ore seemed to run. A large consideration was, in fact, given for this ground by the Devon Consols Company, and very much larger sums would have been willingly given by other prudent persons; yet, strange to say, this ground, about a mile in length, has never up to the present day, although large sums have been expended on it, returned one shilling to the company. Of other mines in the district most proved immediate failures, and for the adventurers these may be considered less disastrous than those which, like Sortridge Consols, East Russell, North Robert, and others, achieved for a time an ephemeral success, leading in the end to only increased losses.

So far for the greatest copper mine in the kingdom; and the same holds good of Minera, the greatest lead mine as yet opened in England during the present generation. Any of your readers, whose memory goes back 10 years, can readily count up a dozen Mineras of various denominations—north, south, east, west, central, and I know not how many more besides. Yet, during all this period *not one* permanent mine has established itself within many miles of the great mine whose name they have so freely taken in vain. Reverting to Cornwall, and looking further back, the same is true of the district about East Wheal Rose, around which during its period of prosperity mines sprung up like mushrooms, almost every one destined to end in disastrous failure; and even in the West Chiverton district it is worth remarking that no neighbouring mine has *as yet* achieved the smallest substantial success. The same law—the law of the isolation of great metalliferous deposits—is found to hold in the districts about the Knockmahon and the Berehaven Mines, in Ireland; in the district about the Ecton Mine, in Staffordshire; and in many more I could mention.

I shall not weary your readers by referring further to this, certainly not the most pleasant side of metallic mining; but in a time like the present, when the great discovery made in the Van Mine, which might and ought justly be made the basis for inducing a large expenditure of public capital in legitimate lead mining in Wales, threatens to generate a senseless and indiscriminate mania, it is well to place before the public the few facts I have mentioned, as showing that the surroundings of a great mine need not necessarily prove successes. There is unquestionably a great deal of ground in the neighbourhood of the Van Mine well worthy of a vigorous trial, and some which may fairly be expected to achieve considerable success. But when any sett picked up within the radius of a few miles, whether a lode has been discovered on it or not, is valued to the public at tens of thousands of pounds, it is well to ask them to bear in mind, as a warning, the indisputable facts I have just stated. Neither in mining, nor, indeed, in any other pursuit that I am aware of, has great success ever been achieved by hanging on to the skirts of another; it is in itself a sign of feebleness, and is justly despised by all really able men. For my own part, I would not value a sett one shilling more for being in the neighbourhood of the Van, or even on the Van lode—if, indeed, any two people could be got to agree as to what, or which, is the Van lode after it has passed a few hundred fathoms from the boundary of the Van sett.

Returning to the VAN MINE itself. The leading idea impressed on the mind of anyone going through this mine is the enormous disproportion between the resources of the mine, as apparent by the underground discoveries, and the means of making these resources available: it is so obviously a mine from which at least twice the amount of ores now sold could readily be produced, if only the means of raising and returning it were available.

This disproportion—which is certainly most remarkable, and entirely beyond anything I have met with in my experience—is due to two causes. In a minor degree it is undoubtedly attributable to the fact that for about two years—and up to within a few months of the present time—the mine had been carried on by executors, who were not in a position to sanction any expenditure except such as was absolutely necessary. But the main cause is in the nature of the lode itself, which, it must be borne in mind, is equal to half-a-dozen ordinary lodes packed side by side. With such a lode it is fairly impossible to keep pace with the discoveries; which is obvious, if we consider that on it as much ore ground can be laid open in a month as could be done on an ordinarily rich lode in a year.

To your mining readers this will be most evident, by comparing the vastness of the discoveries already made with the insignificance of the extent of the present workings. The maximum depth of these workings from the adit (which is itself, at its deepest point, only 30 fathoms from grass) to the lowest sump is but 30 fathoms; and the greatest length opened on the lode below adit has not reached 100 fms. (even at the adit itself it does not exceed 150 fms.), while the total length of the stopes working is but 50 fms. I need scarcely tell any of your mining readers that such a limited extent of workings would scarcely be noticeable in a large Cornish mine, and that the discovery of at least 500,000*l*. worth of ore in such a compass is without parallel in British mining.

To make matters perfectly clear it may be well to give particulars. The lode, as I have already stated, averages 5 fms. in width (although it at places reaches the great width of 10 fathoms), with a moderate underlie south; and this lode is overlain on its south, or hanging, wall by a great band of shale. The engine-shaft is sunk vertically in the country to the depth of 60 fathoms from grass, where it takes the south wall of the lode just at the 30 fm. level below adit, which is the present bottom of the mine. From opposite this shaft the adit (which is 30 fms. from surface) is driven west about 65 fms., and east about 85 fms.—150 fms. in all; and the 15 fm. level is similarly driven west about 44 fms. and east about 36 fms.—80 fms. in all. The levels in the 30 are only opened on about 12 fms. altogether east and west. It must be understood that at present there is at Van only the one opening to surface—that is, at the engine-shaft.

The present work doing in the mine is as follows:—In the adit, both ends may be said to be driving on the soft hanging part of the lode, each by six men, at 60s. per fathom, although the western end is temporarily suspended for want of air. Both these ends are poor, but show splashes of lead in the dark shale, which is said by those acquainted with the lode to indicate ore beneath. The western end loses ground rapidly, and would ultimately come out in the brook forming the boundary between this mine and Pen-y-Clyn, but the eastern end is approaching a part of the lode which showed very promising at surface in some old shallow workings, and where the ore may, consequently, be expected to make again as shallow as the adit. West of shaft, 55 fms., a rise is being put up on the lode in the back of the adit to meet a shaft sinking from surface, the rising and sinking having both been pushed on by six men each, at 80s. per fm. This communication, which will be effected in a very short time now, is of great importance, for I need scarcely say no satisfactory ventilation can be effected in a mine which has only one shaft open to surface. Below the adit, 54 fms. west of shaft, just under were this new shaft will come down, a winze is sinking by six men, at 110s. per fathom, in a lode worth for the width of the winze about 3 tons per fathom. East of the engine-shaft, 60 fms. or so, another new shaft on the lode will be quickly opened up from adit to surface, by rising and sinking, as soon as that to the westward is communicated.

In the 15, the western end, which is the only one being pushed on at present, is driving by six men, at 105s. per fathom on the south part of the lode. In this end there is a course of ore worth for the width of the level upwards of 3 tons per fathom; and as the winze just mentioned as sinking below the adit on the same part of the lode, about a dozen fathoms in front of this end, is also worth 3 tons per fathom, it is fair to assume that the course of ore between them is continuous. Assuming this, which will be proved in a very short time, the length of the course of ore opened out in the 15 at Van will be 100 fms. instead of 85—the length I gave to the ore ground in my last notice of this mine. Of course it must be understood, in taking the value of this end and winze, that they respectively comprise on an average only about one-eighth of the entire width of the lode, and, consequently, here are rather of value, as indicating the *length* of the course of ore than as showing the productiveness of the lode at these points. The 15 east, driving on the soft part of the lode, is at present suspended until better ventilation is secured throughout the mine by the communication already mentioned. The 30 has been commenced driving both east and west. As I have already stated, the lode has been cut through at this level 7 fms. wide, worth for the whole width 27 tons to the fathom. Both ends are driving, each by six men, on the south part of the lode; the east end at 90s. per fathom, and the west end at 100s. per fathom, in a splendid lode, particularly the western end, where the whole width of the level is in a course of ore that will turn out fully one-half of pure galena. In the bottom of the 30 six men are cutting a plat, and six men have been set to drive south through the shale, for the purpose of sinking to the 45 for a new level, and rising and sinking for new engine-shaft.

Except what has been raised from the tutwork bargains working on ore, which last month was about 50 tons, the whole of the lead returning in Van is broken from one stope in the back of the 15, extending about 50 fms. in length—that is, about 25 fathoms east and about the same distance west of the shaft. This stope is working by nine pares of men, as follows, taking the bargains from west to east:—The 24 stope west by six men, at 42s. 6d. per fathom; the 16 stope west by six men, at 47s. 6d. per fathom; the 8 stope west by six men, at 47s. 6d. per fathom; the 8 stope east by eight men, at 57s. 6d. per fathom; the 16 stope east by eight men, at 60s. per fathom; the 24 stope east by eight men, at 55s. per fathom; the 8 stope east, on the north part of the lode, by six men, at 50s. per fathom; the 16 ditto by six men, at 50s.; and the 24 ditto by six men, at 52s. 6d. This gives a total of sixty men, at an average of about 51s. 6d. per fm.; and during the last month the total cost of these sixty men was something under 260*l*., and the quantity of ore raised by them 150 tons. This gives an average of $2\frac{1}{2}$ tons of ore per man, and shows the average cost of breaking the ore to be 34s. 8d. per ton; or, taking the average value of the Van ore, after paying royalty, at 12*l*. 10s. per ton, a tribute cost of, as near as possible, 2s. 9d. in 1*l*. Now, I venture to think that, considering the exceptional system of working adopted at Van, by which the *whole* of the lode is taken away at once, rich and poor together, it will be difficult to match such an average result as this in any other lead mine in the kingdom. For your nonmining readers to understand the force of this comparison, it may be well that I should explain the principle upon which ore ground is usually taken away in mines.

After a good run of ore ground has been driven through in a level, it is set about being opened out, and put in form for being worked away, by rises being put up in the back to the level above, and winzes sunk in the bottom to the level (or towards the future level) beneath. In a lode varying in richness—and all lodes vary more or less—the points selected for these rises and winzes are naturally and properly the richest parts of the lode. When these rises and winzes are communicated to the levels above and below respectively stoping is commenced, and continued so far as the lode remains rich. The moment the lode becomes poorish—not too poor to be worked to a profit, but not rich enough to be worked to a large profit—these stopes are suspended, and the poorer ore ground remaining is kept in reserve for a "rainy day." As long as the mine continues in new levels to open out well, and in mines worth anything this does continue for many years, either in depth or length, this poorish ore ground is allowed to remain, and at last accumulates to a vast extent. This is the case with all lodes, but it is more especially the case with wide ones, in which on either wall, parallel with the richer bunches, it is not unusual to find wide courses of poorish ground which just comes away at a small profit; in the rich days of a mine these parts of the lode are also left standing. Any person going through a mine which has been worked for some years, but which is still rich, will find to what a great extent this is the case. In going through a level the backs of which have been largely worked, he will probably observe to the captain that most of the ore ground in the back of that level has gone to market; and the captain will reply that the best of the ground has certainly so gone, but that there still remain hundreds of fathoms of "tribute ground" to come away some day, when—he will probably add, jokingly—"We shall want it more than we do now."

Thus in almost every rich mine there are (after the first stage of trial) two stages of working. The first stage comprises the period during which the mine continues to open out rich, and during which the richer parts only of the lodes are taken away; while the second comprises the period after which important discoveries have ceased, and during which the mine has to fall back on resources frequently very extensive in themselves, and of a great gross money value, but capable of yielding but a very small profit. Every investor in mines of 25 years standing (and there are a few such) must have noticed this. A mine cuts rich, and there follow a dozen or fifteen years of great prosperity, after which dividends quickly dwindle, and then cease, although the mine itself continues working, and nearly self-sustaining, by making very large returns from this poorish ground for another dozen or fifteen years. These are the two stages (after discovery) of most mines—during the first the mine is worked for the benefit of adventurers, during the second for the benefit of the country.

Now this system of dealing with ore ground is perfectly legitimate, and perfectly proper, although it is, of course, open to abuses, as when such poor ore ground is (as is sometimes the case) valued as "reserves," when, in fact, taking into account all the expenses of the mine, it can never by itself be returned with any profit to the adventurers. But although this system, by which, while a mine is opening out rich, only the cream of the lode is taken away, leaving the poorer portions for a future day, is legitimate enough, it is *not* the system followed in Van, where, as I have already more than once stated, it has been deemed prudent, in consequence of the enormous size of the lode, and the bad nature of the hanging-wall, to take away the whole lode bodily in one stope, and then fill up with deads. The result is that with a large quantity of rich ground a still greater quantity of poorish ground has to be broken monthly, which reduces considerably the average; and I think it will surprise many people to be told that, in a young and rich mine like Van, of late months it has taken 20 tons of stuff, as broken in the stopes, to produce 1 ton of clean ore. Yet such is the case. To return the 200 tons of ore sold last month fully 3500 tons of ore stuff had to be broken, drawn to surface, crushed down, and put through all the processes of dressing. In the case of a large mine, having an extensive plant of machinery (the putting up of which is essentially a question of time), this would not be of much moment, for in many of our greatest and most profitable lead mines the average value of the ore raised is very much lower. But in the case of a young mine like Van, which has not been six months in the hands of the present proprietors (up to which time it was worked by executors), and where there has been as yet no time to get up working and dressing appliances, in proportion to the underground discoveries, it has, of course, limited the returns. If the coarse I have described as being that ordinarily followed in taking away ore ground—of first only taking the cream—had been adopted in Van, the average value of the stuff raised from underground could easily have been more than doubled, and the returns, even with the present dressing power, have been proportionately increased.

But since this course, which although not absolutely in a mining view an improper one, would certainly have been a most rash and imprudent one to have adopted in the case of so peculiar a lode, has been out of the question, the Van shareholders have perforce been content to postpone for at least a year—until adequate machinery and appliances can be put in place—the great returns which, from the underground discoveries, the mine is now capable of making. With the discoveries made in the 30, far richer than anything in the 15 above, this mine may fairly be held capable of returning about 500 tons of lead ore per month when the ground is sufficiently opened and ventilated, and the crushing power and dressing-floors sufficiently extended; and this quantity can be raised at an exceptionally large profit. On the present returns of 200 tons per month (net value, after paying royalty, say 12*l*. 10s. per ton) the profit on the ordinary working cost of the mine is fully two-thirds, or about 20,000*l*. a year. Of course, of this profit a considerable sum is being laid out in new works, and consequently it is not all available for dividends. Increasing returns, and the support of an increased plant of machinery, will, no doubt, increase cost; but, considering how shallow Van is, and how cheap a mine it is in almost every respect to work, I do not at all see that, for many years to come, the cost is at all likely to be more than one-third, leaving two-thirds of the value of the ore raised net profit. This, with a return of 300 tons per month, which may be expected to be reached before the end of this year, will give a profit of 30,000*l*. a year; and the 500 tons per month, when reached another year on, will give 50,000*l*. a year, and place the Van indisputably at the head of British lead mines. And this estimate is irrespective of blende, of which the lode contains large quantities. At present the pressure to dress the lead ore is too great to allow of much attention being given to the less valuable product; but when the floors are extended there can be no doubt very considerable returns of blende will be made monthly, which will add largely to the profits of the mine.

The present cost of dressing the ores at Van is just 20s. per ton—the dressing cost of the last 200 tons having been 202*l*., which, taking into account the not very high produce of the stuff as broken and raised, and taking also into account that there is a great pressure and crowding of work on the floors at present, must, I consider, be taken as very moderate. However, Capt. Williams estimates that this will shortly be reduced to 15s. per ton, which reduction will be brought about partly by an increase in the floors giving more scope for economical working, and partly by the prospective improvement of produce of the stuff from underground, which, with the richer lode now opening on in the 30, will, it is expected, give 1 ton of clean ore for 15 tons of stuff, instead of 20 tons, as at present.

The motive-power at present at Van is as follows:—One 50-feet water-wheel, 4-ft. breast, which, coupled with a 30-in. cylinder beam double engine, pumps, crushes, winds, and works the jigging-hutches; one 14-in. horizontal engine, which works Blake's stone-breaker and the sawing-machine; and a pair of 12-in. horizontal cylinders (3-ft. stroke), now nearly ready, which will work the new crusher, and also an 8-in. plunger, which will revolve or throw back the water which has been already used on the floors. There are three crushers on the floors—two with 30-in. rollers and one with a 24-in. roller. There are twenty jigging-hutches, four round buddles and four flat buddles. The pitwork is $6\frac{1}{2}$ in. from the 30 fm. level to the 15, and $6\frac{1}{2}$ in. and 5 in. from the 15 to adit. The carriage to and fro, from the mine to the railway station at Llanidloes, is 4s. per ton.

MINERS' LAMPS.—Mr. LOUIS DESENS, C.E., of Charing-cross, has specified an improvement on a former patent, which consists in lowering the gallery in the interior of the body of the lamp so as to admit of the whole of the mechanism being closed in by the platform (which in this case is raised above the gallery), the object being to prevent any tampering therewith, and the more effectually to prevent the miners (in the event of their successfully opening the lamp) from relighting it. With this view he makes a circular aperture in the centre of the platform for the reception of a circular metal plate, having in its centre a small tube forming the burner up which the wick passes; this piece is got into position by screwing, two small projections in steel being thereto fixed for this purpose, a check being attached to the interior of the central aperture, the largest of these projections on coming in contact with a boss attached to a spring forces the latter backwards, allowing the projection on the plate of the burner to pass; when this is effected the whole is closed, so that no one unconnected with the secret of opening the lamp can possibly reinstate the wick for lighting. It is by means of the detent mentioned in the former invention that the wick and holder become accessible for re-adjustment. This detent is slightly elongated, so as to admit of its passing through a small slot in the platform, and by pressing it outwards to the left with the thumb the small horizontal shaft at its extremity (as described in his former patent) is brought to bear against the boss on the spring before alluded to, and forcing it back, the projection on the circular plate of the burner is freed, and then by turning the piece it is readily removed either for re-adjusting the wick or refilling the lamp with oil. In all other respects the functions of the several parts mentioned in the previous invention remain unchanged, the object of the present improvement being to effect a further safeguard against relighting or exposing the flame, as any attempt so to do without the knowledge of the secret lock would be futile, as in the event of a miner succeeding in opening the lamp, the light being extinguished, as explained in his former patent, the wick cannot be got at.

PRECIPITATING COPPER, &c.—Messrs. W. A. VEREL, manager, and J. CAMERON, chemist to the Tharsis Sulphur and Copper Company, of Glasgow, have specified their invention for improvements relating to the precipitation of copper and other metals from solutions by iron, and to their extraction from slag or scoria. The invention has for its object to economise the iron used in the precipitation of copper and other metals from solutions, to render the precipitation more rapid and the precipitate purer than in the ordinary process, and to utilise the residuary liquor. In obtaining copper by what is known as the wet or cementation process, as ordinarily practised, the copper contained in iron or copper pyrites or in other ores having been converted by calcination into a salt of copper, such as a sulphate or chloride, is dissolved and washed out from the ore with water. The solution thus formed contains other salts as well as the copper salts, and amongst these per-salts of iron which attack and waste the iron afterwards used for inducing the precipitation of the copper. The first part of the present invention consists in reducing these per-salts to proto-salts by treating the solutions with sulphurous acid or gaseous mixtures containing it, such as may be obtained by burning sulphur or pyrites or other substances containing sulphur. This sulphurous acid combines with the surplus oxygen of the per-salt, and in reducing such salt to a proto-salt is itself converted into sulphuric acid. The application of the sulphurous acid may be effected by means of a tower or canal, or any other convenient arrangement by which the two can be brought into intimate contact. A solution of sulphurous acid may also be used for deoxidising the liquor. When the liquors have been deoxidised as described, it is found that the subsequent cementation process is effected more rapidly and advantageously. It is preferred, in order to avoid

waste of iron, to run off the liquor from the cementation tanks just before the whole of the copper is precipitated, and to complete the precipitation in separate vessels, by carefully adding the requisite quantity of spongy or other iron. The second part of the invention consists in utilising the residuary liquor from which copper or other metals have been precipitated by exposing it in a tower or otherwise, so as to absorb oxygen from the atmosphere to convert the proto-salts into per-salts, which last may be advantageously used for dissolving out copper and other metals from slag or scoria containing them.

CONFERENCE OF COAL MINERS.

A Conference of the Coal Miners of Lancashire, for the discussion of a variety of subjects affecting their interests, was held in the Mechanics' Hall, Manchester, on Monday, when Mr. ALEXANDER MCDONALD (President of the National Association of Miners) was in the chair, and there was a numerous attendance of delegates. Wigan and the district were represented by 54 delegates; 32 were from Farnworth and Kersley, 10 from Oldham, four from Ashton, 10 from Worsley, two from St. Helens, and one from Poynton.

The CHAIRMAN said that an accident so grave in its character had taken place within the last few days that he could not refrain from departing from the printed programme of that Conference by calling attention to it. He referred to the explosion at Haydock, by which 58 lives had been lost. During the last few months they had had the Hindley Green explosion, by which 62 lives were sacrificed; in December, an accident occurred at Haydock, sweeping off 26 men; in the Norley accident 7 lives were lost; 32 at Park Lane; 3 at Johnson's colliery; 30 again at Park Lane; and, lastly, 58 at Haydock. The other day an explosion of nitro-glycerine occurred in Carnarvonshire, which shocked all England from its centre to its circumference. The House of Commons looked grave at the occurrence, and he was informed that the Home Secretary was about to bring in a Bill, or had brought in one, to prohibit the manufacture of nitro-glycerine, because it was a dangerous element. If an explosion of that character, which was insignificant when compared with the terrible colliery explosions that had occurred, created such alarm throughout the country, ought the colliers to allow explosions to go on in their very centre, taking away hundreds annually? He felt satisfied that every colliery explosion was a crime. With very few exceptions, if law and equity were brought to bear, the owner or the agent of the coal mine would have been tried for murder. If the trade and wealth of England were to be increased on human suffering, he would say perish that trade rather than permit the suffering; and if the Home Secretary brought in a Bill to prohibit the manufacture of nitro-glycerine, he was doing nothing more than saying let trade perish at once rather than endanger human safety. The general explanation given at inquests in reference to explosions was that a lamp had been unlocked or a shot had been recklessly fired, and every effort was made to shield the owners and managers from the charge of neglect. He hoped that the miners of Lancashire would be no longer deluded by such a snare and mockery. He spoke as a practical man when he said that, as a general rule, explosions could not occur if the gas were rendered harmless. Every inquest proved that the miners were constantly surrounded by a magazine, compared to which the element than nitro-glycerine. Further protection to the miners was absolutely required. It had been suggested to him more than a thousand times that the miners should take a strong measure, and he was afraid a strong measure would have to be resorted to before protection was given. It had been suggested to him that all the miners of England, Scotland, and Wales should lay down their tools in the very dead of winter for six or seven days, and insist upon having protection. (Applause.) God forbid that they should be required to resort to such a remedy, but they could not forever be begging for protection at the doors of the House of Commons. His deliberate conviction was that as a rule inquests were a farce and a mockery. There was scarcely a witness examined, even the Inspectors themselves, whose evidence did not read two ways—first against the employers and then in their favour. He was told that when the first explosion occurred at Haydock, the foreman of the jury was so very intelligent that he asked the coroner what verdict they should return. He thought that the duty of that meeting was to send a memorial to the Home Secretary, calling upon him to appoint a special jury to enquire into the Haydock explosion, and also a Royal Commission to enquire into the colliery explosions that had occurred in Lancashire and Wales during the past twelve months. (Applause.)

Mr. W. PICKARD (Vice-President of the Conference) said it was high time that some pressure should be brought to bear upon the House of Commons to secure protection to the working miners. He could fearlessly state, in the face of the scientific teachings of the day, that every mine in Lancashire could be safely worked with a naked candle if the ventilation were properly attended to. The present mode of ventilation in many mines was strongly condemnable. He was satisfied that until more impartial enquiries took place, free from the masters, the real cause of accidents would not be made known. He looked upon the Queen's Pit at Haydock as a slaughter-house. He had been appointed by the miners of the Wigan district to watch the inquest, but he could assure them that it was hard work to do so. Sometimes a man would not speak the truth, lest he should lose his situation.

Mr. W. HAYES (Bolton) moved that a petition should be presented from the Conference to the Home Secretary and to both Houses of Parliament, praying for a special jury to enquire into the Haydock explosion, and a Royal Commission to enquire into all explosions, and report thereon, that have occurred in Lancashire and Wales during the past twelve months.

Mr. JONES (Kersley), in seconding the resolution, said that at the enquiry on Saturday into the Haydock explosion, the Coroner stated that juries did not always get at the bottom of these explosions.—The CHAIRMAN: It is a disgrace that he should make such an acknowledgment to the public. (Hear.)

Mr. J. BOOTH (Hyde) said that a pit which was not fit for a candle to burn in was not fit for a man to breathe in.

Mr. ASPINALL (Westhoughton) and other delegates said that it was well known that miners dared not speak the truth at inquests, being afraid that if they did so they would lose their situations.

The resolution was adopted without opposition.

The Conference then proceeded to discuss the first subject on the paper, "The Cause of our Present Position, and the True Remedy for it."

The CHAIRMAN, who opened the discussion, said that this was a very comprehensive subject. It was now a very considerable time since the note was first sounded of the fall of wages, and the lowering of the price of labour to the labourers throughout Lancashire. He totally disputed the statement that the cause of the reduction of the price of labour was slackness of trade. The coal trade was gradually expanding. There could be no doubt that the coal and iron trade of this country had been highly successful for many years past. Instead of there being slackness of trade, there was an over production of coal. He was almost satisfied that the development of the coal fields around Wigan alone was such as to supply the requirements of Lancashire, Yorkshire, and Cheshire. He held it to be their duty to restrain over production. Stint of labour to eight hours per day was the only practical remedy. Competition was another cause of the reduction in the price of labour. The wits of all employers were at work to devise means whereby labour should be reduced. It was their duty to consider whether it would be desirable to determine upon short time or whether they should emigrate.

Mr. MICHAEL M'CARTHY (Leigh) said he would rather suffer a month's privation by standing out and maintaining a just price for his labour, than he would submit to a reduction of wages below the fair standard.

Mr. JOHN SMITH (Wigan) said that if the eight-hour system were carried into effect it would be the greatest blessing to colliers they had ever had.

Mr. HALL (Little Lever) advocated a restriction of labour throughout the country.

Mr. JONATHAN FINAL (Little Hulton) spoke in favour of amalgamation on the part of the miners.

Mr. J. LOMAX (Bolton) said that the Wigan district was looked upon with a great deal of suspicion. It had become notorious for the hours which the men worked, for the amount of coal which was brought up to the banks, and for the little money that was paid. He did not look upon emigration as being at all necessary at the present time. Some men, it was said, worked 12 hours per day, some 14, and some 20, and it was a matter of necessity that those hours should be curtailed.

Mr. GREENHALGH (Westhoughton) said that if an amalgamation society were formed in Lancashire, he had no doubt that it would be joined by other parts of the country. He did not believe that there was an overplus of colliery labour, but, on the other hand, he believed there was not a sufficient number of labourers in England.

Mr. PICKARD said that there was a strong desire in Lancashire to remedy the evils complained of. He was satisfied that Wigan was not perfect, but that district did not stand alone. Over production was the great curse, and the men instead of working eight hours per day were working 12, 16, and in some instances over 20 hours. To remedy the over production of coal it would be necessary, in the first instance, to establish local or sectional organisations, then a permanent county association, and lastly a general organisation for the whole country.

Mr. HALLIDAY (secretary of the Conference) and others having spoken upon the subject, the CHAIRMAN, referring to some remarks that had been made, said that he was anxious to bring up an agitation throughout the county, said that the first point for agitation should be a reduction of labour to eight hours per day, and the second point an advance of wages. It might be desirable to make a levy upon each man in the Union for the purpose of carrying on the agitation for a month.

Mr. SILCOCK (Wigan) proposed that an agitation should be got up in favour of eight hours per day, each man to have a tub in his turn; and that at the expiration of one month a meeting should be held to decide when the eight-hours work should begin, and the present system be discontinued.

In the course of the discussion several delegates advocated an equality of wages, whilst others spoke for a restriction to 3s. per day.

Mr. Silcock's resolution was carried by a large majority, and the Conference adjourned.

The Conference was resumed on Tuesday, when the CHAIRMAN (Mr. McDonald) said that the subject for discussion was the best means of stopping the movement for the reduction of wages which was still passing over the country, and of obtaining a rise of wages at once. It appeared to him that the true remedy against the reduction of wages had been found on the previous day, when it had been resolved to shorten the hours of labour, and it would not, therefore, be necessary further to discuss the question. The best course to pursue now was to consider whether it would be politic to make an immediate demand for an advance of wages, or to defer further action until a meeting to be held a month hence, when the Conference could be guided by the agitation that in the meantime would be going on.

Mr. HALLIDAY, secretary to the Conference, suggested that a deputation should be sent to Wales, Staffordshire, and other districts adjacent to Lancashire, with the view of securing a combination of action in agitating for an advance of wages.

Mr. J. LOMAX, Bolton, moved that North and South Wales, South Staffordshire, and Durham should also be agitated.

Mr. FINAL spoke in favour of an extended agitation, which should embrace the United Kingdom in one amalgamated organisation.

Mr. C. SILCOCK proposed an amendment to the motion, to the effect that notice should immediately be given requiring an advance of wages at the end of the fortnight. This amendment, however, did not meet with general support, and was ultimately withdrawn.

The CHAIRMAN was satisfied that the death-knell of long hours had been struck by the resolution which had been passed on the previous day, and that the way had been paved for an early advance of wages.

Mr. PICKARD suggested that, together with the agitation to be carried on in Lancashire during the next month, an appeal should also be made to all mining districts, asking the miners to agitate for the same.

After some further discussion, a resolution was adopted to the effect that that an agitation of the question of an advance of wages should be carried on in Lancashire during the next month; and that, in the meantime, an appeal should also be made to adjoining mining districts to join in the agitation, and that at the end of the month another conference should be held, at which the day should be fixed when an advance should be demanded.

The next question for consideration related to the Mines Regulation Bill.

The CHAIRMAN said it would not be necessary, beyond a word of explanation, to consider that question, inasmuch as there was no Mines Regulation Bill now before Parliament. The causes which had led to the withdrawal of the Bill were varied. The past session of Parliament had been one of extraordinary labour and excitement, and there had been, so to speak, a fixity of intention or determination on one point, and on one point alone—he meant the question of the Irish Church—and he could see from the outset of the session that there was a very strong desire on the part of the Government to undertake to enter upon no work of legislation in which their party might in any degree be broken up. Hence, week after week, and day after day, the Mines Regulation Bill was put upon the paper—it was always down for discussion—but when the night fixed arrived the Bill was again and again postponed, until last week, when it was finally withdrawn. The Bill, however, it was his duty to tell them, had excited very considerable attention on the part of the House of Commons. They would at once see the amount of attention which had been excited when he stated that there were no fewer than 10 or 12 pages of closely printed matter put down as amendments on the Bill. These amendments were numerous and varied, and many divisions regarding them were inevitable. He regretted that the Bill had not been gone into and passed in the present session, but he believed that next session, when the Bill came before the House of Commons again, as Mr. Bruce had promised, it was likely it would meet a more independent consideration than it could had done during the present session, and next year a better Bill would be passed than, on account of what he had stated, could have been possible during this year. Mr. Pickard and himself had begun to talk yesterday about legislation for mines, and they thought they could discern "the signs of the times." What he thought was that the spirit of opposition which had been excited formerly against the agitation of miners' grievances had now been in a great degree dispelled. Formerly those who took an interest in these questions were a very small band, and they were called upon to entreat and almost to implore men to listen to the miners' grievances. During the present session of Parliament, however, they had found that there was a desire generally on the part of members to learn what the opinions and wishes of the miners were, and what could be done to remove the causes of which they complained. He attributed this increased interest on these questions on the part of members of Parliament to the extension of the constituencies, of which miners now formed a large proportion. He was glad to observe that a general system had been evoked against the truck system (which he was happy to find had very little hold in Lancashire), and against all deductions from the miners' wages. It was also of considerable interest to mention that on the day before the Bill was withdrawn Sir Robt. Anstruther, the member for Fifeshire, had placed on the notice paper a proposal to the effect that miners' wages should be paid every week—(cheers)—and he was glad to say that a very general feeling was expressed on the part of members in favour of this motion.

The Conference then proceeded to consider the next subject on the programme—"A Thorough Organisation of the Miners of the County, its Necessity and Use."

Mr. WM. HAYES, Bolton, moved that a general combination of the miners of Lancashire for the protection of their interests should take place, and Mr. JAMES LOMAX, Bolton, seconded the motion.

Mr. MICHAEL M'CARTHY expressed his fear that, unless the Lancashire combination should be the forerunner of a general combination throughout the country the proceedings which had taken place would be useless, inasmuch as in the event of a strike in any part of the county the miners in the other parts of the country would supply the demand for coal, and any partial combination would be ineffective.

Mr. PICKARD thought that, while it was proper to declare generally in favour of the principle of combination, it was premature, at that time, to form the basis of any organisation, because the delegates present had not been authorised by their constituents to form an organisation. He thought the business of the present meeting ought to be to devise some way of creating funds to carry on an agitation, with good results, in a properly constituted organisation.

After some further conversation, in which Mr. Halliday, Mr. Morris, Worsley, and others strongly urged the necessity of combination, and spoke of the advantages which had been gained by the various strong Unions formed by the stonemasons, the amalgamated engineers, and the joiners, the CHAIRMAN suggested that the best settlement of the matter would be that the delegates present should pass a resolution in favour of general action for a combination of miners in Lancashire for the protection of their interests; that a small committee should be appointed to draw out rules upon which the combination should be proceeded with, and which should be considered at the next meeting of the Conference—(hear, hear)—and, further, that the same committee should act as the executive of the county until the monthly meeting. After some further consideration the Chairman's suggestions were put separately as motions, and carried unanimously.

It was agreed that the committee should consist of five members, and the following gentlemen were elected:—Mr. Worrall, Farnworth and Kersley; Mr. Lewis, Wigan; M. J. Morris, Worsley; Mr. James Beech, Oldham, Ashton, and Dukinfield; and Mr. Joseph Topping, St. Helens and Heydock. It was understood that the committee should receive the advice and assistance of Mr. Pickard, miners' agent, and Mr. Halliday, the secretary of the Conference. It was agreed that a levy of 4d. per head should be laid on the various districts represented by delegates, it being specially understood that, as the Conference was held irrespective of any society, but as generally representative of the miners of the county, the levy should embrace all miners, whether society or non-society men.

The subsequent business of the Conference was almost entirely formal. A statement was made by a deputation from the South Yorkshire Miners' Association, explaining their position; after which the following resolution was unanimously passed:—"That this Conference pledges itself to support the South Yorkshire miners; and in order thereto, that every delegate present bring the matter before his constituents, in order to get support as soon as possible forwarded to them." Votes of thanks brought the proceedings to a close.

COLLIERY EXPLOSIONS.

The following letter has been addressed to the Editor of the *Manchester Guardian*:—

SIR,—You quote to-day from the *Times* a long article on the Haydock explosion, which contains in substance these assertions:—

1.—That most of the colliery explosions are due to the carelessness of men who pay for their neglect with their lives.

2.—That it is common for the underlooker to neglect his own duty, and to depend on the fireman to see that the workings are safe.

3.—That many, if not a majority, of firemen can neither read nor write, and cannot, therefore, read their instructions.

4.—That the Coroner, in opening the inquest, said he and the jury knew very well that they did not get to the bottom of these things.

You also report in the same paper a Conference of Coal Miners, in which Mr. Pickard (Vice-President) says:—

5.—He could fearlessly state, in the face of the scientific teachings of the day, that every mine in Lancashire could be safely worked with a naked candle if the ventilation were properly attended to.

6.—Sometimes a man would not speak the truth on an inquest lest he should lose his situation.

To which Mr. McDonald (the President) adds:—

7.—His deliberate conviction that, as a rule, inquests were a farce or a mockery.

It seems to me that we have here got two sides of a very serious case, which deserve as much attention as if a Royal Commission had reported it as evidence.

No. 1 doubtless points to the ignorance and carelessness of common miners, who, in defiance of instructions, use naked candles in the workings. Such ignorance is battled with in the mines of the Bridgewater Trustees by sending round to the night school classes a scientific lecturer, and, so far as I can learn, with very good results.

But if there be any value in No. 5, then the whole thing is resolved into the efficiency of the inspection and the enforcement of sufficient means of ventilation. I do not know what are Mr. Pickard's scientific attainments, or how many of the Lancashire mines he is acquainted with, but he is, or rather was, a practical miner, and is an intelligent man.

Assuming that it is impossible to get rid of all danger by ventilation, then the duty of the underlooker should be vigorously enforced, and the payment should be made sufficient to secure able and conscientious men for the situation.

All firemen ought to pass an examination by the Inspector to prove their fitness prior to appointment.

And if it be the case that men hide the truth at inquests, lest they should lose their situations, it would surely be as possible for the Colliers' Union to get over that difficulty as it is to call out thousands of men from employment and to keep them for months without work. Let them provide an Inquest Victims' Fund, and make it generally known that no man shall suffer for speaking the truth, and the atmosphere of the jury-room will soon be as much purified as the fiery mines under the best possible plans of ventilation. JOHN WATTS.

Referring to Mr. Watts' letter, Mr. J. H. Clark writes—

"Several assertions are quoted and commented upon which, from facts I have gleaned in conversation with old and experienced miners, I can fully corroborate. Only a few days ago I was questioning an old collier—one who narrowly escaped in the Haydock explosion—on colliery accidents generally, and it was his firm conviction that the majority of explosions occurred either through the ignorance or carelessness of the firemen; and he also stated that the miners feared to offend the underlookers by refusing to enter workings reported to be safe. This is but the substance of what I have repeatedly heard, and so long as such indirect and undue influence is brought to bear, by negligent underlookers, on men who will risk life rather than situation, so long shall we have repetitions of colliery 'massacres.'"

THE MINING ATLAS.*

We are glad to see that the second number of Mr. THOS. SPARGO'S work has just appeared, and that it deserves the encomiums which we felt it our duty to bestow upon the first. The title of the work discloses its purport, but it is much more than its title, or any short title, could express. It is designed to convey accurate information concerning the chief metalliferous districts in Great Britain and North America. This is done by voluminous and excellent letterpress; by maps of mining districts and territories, and sections of the most remarkable and productive mines. The author has fulfilled his programme thoroughly, but it is still a puzzle to us how six maps and sections, beautifully coloured and on a very large scale, together with 31 pages of original description, quarto size, on excellent paper, full, clear type, can be sold for a shilling. Mr. Spargo must have more regard for the fame than the profit that will accrue to him, or to the usefulness he effects more than to either or both.

There is a beautiful map of the Chontales gold and silver mine, one of the most important mines, indeed, in America. The map is so contrived as to depict sections of the Javali River, showing the plantels, or water powers, of the Chontales Gold and Silver Mining Company. There is an admirable map showing a "rough plan" of the mining setts in lower California, together with the line of lodes traversing the districts. The Devon Great Consols district, situated in the counties of Devon and Cornwall—"a surface plan." A plan of the St. Just mining district, Cornwall. Plan of St. Ives, Uny Lelant, and Towednack mining district, Cornwall. Great Wheal Vor—longitudinal section of the Metal lode. Map of the six principal mountains of the Union mining district, showing the principal lodes. This is one of the most interesting and useful maps we have seen of the great mineral regions of the south-western portion of the United States. These mountains, clustering around Empire City, are replete with metallic treasures. It would be impossible to do justice to these excellent orographical and topographical representations by any description such as the limits of a notice in the pages of a journal will admit of.

The letterpress contents of No. 2 of the Mining Atlas is also very interesting and important. The first article treats of the Darren Mining district, Cardiganshire. Then follows an article on the Chontales gold and silver mining district. Next there is a description of the Trelawny, Mary Ann, and South Trelawny setts, in the parish of Menheniot, Cornwall. The fourth is a short description of the Devon Consols district. Descriptions of the St. Ives district, in Cornwall, the Great Wheal Vor district, and the St. Just district, afford lively representations of the wealth and industry of Cornwall.

The remainder of this number is occupied with an exhaustive treatise on the mines of Cardiganshire. A general view is given of the mining characteristics of that county, and each mine is separately described, and all essential statistics connected with it consecutively detailed. This department of the number embraces accounts of the condition and peculiarities of the following—Nant-yr-Arian, Claerddyffryn, West Blaendyffryn, Goginan, West Goginan, West Cwm Erfin, Bron-Lan-Gwn-Da, Pen-craig-du, Cae Nant, Level-yr Yel Pwll, Rhencoed, Bwlch Consols, Cwm Erfin, Great Cwmsymlog, Llest Fawr, Western United, Cwm Darren, East Darren, Bronfloyd, Rhos Goch, North Bronfloyd, Bwlch Stellyn, Llaur Cwm Bach, The Vaughan Mine, Peny Cefn, Hafon, and Henfwlch Mines, Ty Nant, Ty Newydd, Llanerch, Cefn Gwyn, Pontgoch, Elgar, Cynell Mawr, Eagle's Nest, Esgair Herr and Esgair Fraith, Bl sen Caylan (or West Poole), West Blaen Caylan, Mountain Lake (by Cefn Gwyn), Penpompren by Cefn Gwyn, Penpompren Tallybont, Pennybank Ergiwydd, Tan-y-Bally, Tan Bally, Bryn Arian, Dolcletwr, Theaddall, Ynysty Dor, Nyadd Llwyd, Copper Level, Ynys-Herystrad-Dynon, Shau Cwm Feliu.

Having extended this review as far as our space allows, we will reserve for a second notice some specimens of the style in which the work is written, and of the geological, mineralogical, topographical, and historical information which it contains. There is much also to interest the antiquarian and the political economist. One thing will certainly strike the most casual peruser of this great work, that it brings into prominence one of the greatest industries of our nation, and that upon which the wealth of nations must mainly rest—Mining. Without it the fields would remain untilled, the flocks unsheared, and the arts uncultivated. England would sink back into barbarism, and not only England but the world. The metals are the appliances of man in working everything else, and in effecting the exchanges of commodities, by which the products of all are disseminated through all, enriching and blessing the world.

* Robert Clark, 31, Threadneedle-street, London.

TECHNOLOGICAL DICTIONARY.

Commercial intercourse between this country and Germany has so largely increased since the establishment of the North German Confederation, that the number of practical men in each country to whom an acquaintance with the technical language of the other has become an indispensable necessity is now very great. The coining of new words to represent new discoveries and new manufactures has added immensely to the number of words in every-day use, whilst the want of uniformity in the system of word-coinage in the different countries, and even in the different trades and sciences in the same country, makes it extremely dangerous (especially in a language not one's own) to rely upon the root forms alone in determining the correct definition for a given technicality. Each workman being, as it were by instinct, familiar with the technical terms connected with his own business, and knowing comparatively little of those belonging to others, technicalities have been almost excluded from ordinary dictionaries, owing to the insuperable difficulties in the way of obtaining the necessary information. The increasing demand for knowledge of this kind led the late Mr. J. A. BEIL to undertake the laborious task of writing a complete technological dictionary in the three principal languages of Europe, and the amount of labour involved may be judged of when it is stated that, notwithstanding the assistance of nearly twenty of the most competent men connected with the various branches of science and manufactures, and the unremitting exertions of a competent staff under the immediate editors, it has taken some sixteen years to bring the book to its present perfection.

The "Technologisches Wörterbuch,"* of which the second volume has just been issued, embraces all the technical terms employed in the general business of the civilised world—in the arts and manufactures; in bridge building, road-making, and railway works; in mines and smelting works; in machine-shops; in civil, military, and naval architecture; and in mechanics, artillery, navigation, mathematics, physics, chemistry, mineralogy, &c. With respect to the general accuracy of the work, upon which, of course, its chief value depends, it is sufficient to state that Dr. Unverzagt is himself Co-rector of the Technical School at Wiesbaden, and that he has been assisted in the preparation and revision of the several portions of the book by Dr. Wedding (K. Bergrath and Professor in the Berlin Mining School) for the mining and smelting terms, and those connected with the manufacture of metal and allied subjects; and by Mr. E. Althans, M.E., of Halle, for the mining, salt works, and tunnelling terms; whilst Mr. L. Bach, of Linden, has undertaken the revision of the terms relating to the construction of machinery and steam-engines, and the terms used in other branches of trade have been entrusted to equally competent authorities. The dictionary is admirably arranged and printed, and, as the word defined is given in a much bolder type than the definition, any word sought can be easily and speedily found. The work, as a whole, is far beyond comparison with any other dictionary which a practical man of business could purchase, although the price at which it is issued places it within the reach of all; it is a really valuable book.

* "Technologisches Wörterbuch, Deutsch-englisch-französisch." By WILHELM UNVERZAGT, assisted by numerous collaborateurs practically connected with the various branches of industry and science. London: Trübner and Co.

MACHINERY AND MILLWORK.

The manuals on Civil Engineering and Mechanics by Prof. Rankine have long deservedly enjoyed a high reputation amongst practical men, and are unquestionably the most complete and cheapest which have yet been issued: he has now added another to his already rather long list—A Manual of Machinery and Millwork*—which will be, perhaps, more generally acceptable than any which has preceded it. The manner in which Prof. Rankine has treated the subject affords the student every possible facility. The work is divided into three parts, in which the geometry of machinery, the dynamics of machinery, and the materials, strength, and construction of machinery are in turn dealt with. As the author has very judiciously inserted explanations of such arithmetical, &c., processes as are required for the practical application of the information given, the work will prove of utility even to those who have but a small share of elementary mechanical knowledge.

The section devoted to the Geometry of Machinery embraces that portion of the subject which Prof. Willis calls the Science of Pure Mechanism; machines are considered with reference to the comparative motions only of their moving parts, and rules are given for designing and arranging those parts so as to produce any given comparative motion. As the object of these rules is to adjust the dimensions of the parts of machines by processes of practical geometry, Prof. Rankine has wisely adopted the principle of solving every question by drawing rather than by calculation, except in a few special cases, where the latter is indispensable. In explaining the elementary rules of descriptive geometry, the general explanations are succeeded by illustrations of the projections of points, lines, &c., and traces of lines and surfaces; and there are given the leading elementary rules, such as those relating to straight lines and planes. In the second and third chapters the motions of primary and secondary moving pieces in machines are treated, the concluding chapters of the part devoted to the consideration of elementary combinations in mechanism, of aggregate combinations, and of adjustments. Several of the problems are solved by methods

* "A Manual of Machinery and Millwork." By W. J. MACQUORN RANKINE, C.E., LL.D., F.R.S., &c. London: C. Griffin and Co., Stationers' Hall-court.

not hitherto published, and which possess advantage in point of ease and accuracy—the drawing of rolling curves, certain kinds of cams, the construction of the figures of teeth of skew bevilled wheels, and of threads of gearing screws, by the help of the normal section, and improvements in the details of processes for designing intermittent gear, link motions, and parallel motions being worthy of particular mention.

In the next part, which is devoted to the Dynamics of Machinery, the forces exerted and the work done in machines is treated of, as well as the means of measuring those quantities by indicators and dynamometers, of determining and balancing the reactions of moving masses in machines, and of regulating work and speed, and the efficiency or proportion in which the useful work is less than the total work in the different sorts of moving pieces, and in their various combinations. In the first chapter of this part Prof. Rankine gives a summary of general principles; and afterwards treats of the performance of work by machines, of regulating apparatus, and of the efficiency and counterefficiency (this is a word coined by the author to denote the proportion in which the total work in a machine is greater than the useful work) of pieces, combinations and trains in mechanism. In this connection Prof. Rankine refers to all the principal forms of machinery, and the relative merits and defects of each are carefully pointed out. Thus, he states that for Schiele's antifriction pivot, whose longitudinal section is the curve called the tractrix, the moment of friction is—the coefficient of friction ×, the load × the external radius. This is greater than the moment for an equally smooth flat pivot of the same radius; but the antifriction pivot has the advantage, inasmuch as the wear of the surfaces is uniform at every point, so that they always fit each other accurately, and the pressure is always uniformly distributed, and never becomes, as in the case of other pivots, so intense at certain points as to force out the unguent and grind the surfaces. Other arrangements are referred to in an equally careful manner, so that the judgment is improved as much as the knowledge is increased.

Referring to the materials, strength, and construction of machinery, the materials used are first treated of—iron and steel, various metals and alloys, wood and other organic materials, &c.; and in the second chapter the principles and rules relating to the strength of materials; this is followed by an explanation of the special principles relating to strength and stiffness in machines, and of the principles of the action of cutting tools. By this mode of treatment a knowledge of the properties of various materials as affecting their treatment and use in the construction of machines, the general principles of the strength of materials, the special application of those principles to questions relating to the strength and construction of the various parts of machines, &c., are thoroughly imparted to the reader.

The work, as a whole, is an extremely valuable one, and well calculated to assist the practical engineer to acquire a large amount of sound and useful knowledge connected with his business—knowledge which cannot fail to facilitate his advancement as a workman, and to enable him to detect the errors or defects in any machinery that may be submitted to his examination.

FOREIGN MINING AND METALLURGY.

A great quantity of rails contracted for in Belgium still remains undelivered. Thus, of 25,000 tons of rails to be supplied to Finland only 5000 tons have yet been actually supplied. Again, out of 70,000 tons of rails to be supplied to lines in Austria and Hungary, and ordered by Dr. Strousberg, only about 25,000 tons have been delivered —5000 tons by Montigny, 10,000 tons by Seraing, and 10,000 tons by the works of the old Syndicate, so that 45,000 tons still remain to be delivered. To this considerable total must be added a fresh order for 32,500 tons, which has been given out through Dr. Strousberg, on whose account these 77,500 tons have still to be supplied. Further account must be taken of 15,000 tons of rails ordered for the Kaschau and Oderberg line, 10,000 tons for Fiume, &c. Altogether, a careful calculation shows that Belgium has now orders for 193,500 tons of rails still to be executed. The productive powers of the eight principal rail works of Belgium are estimated at 13,250 tons per month, so that Belgian metallurgical industry would appear to be provided with rail orders for 15 months in advance. This is satisfactory enough so far as it goes, but it is urged that it will be bad policy for Belgian ironmasters to indulge in any exaggerated pretensions as to prices on the strength of the present state of affairs. There is nothing new in the condition of the Belgian coal trade, which is in its dead season, as usual at this period of the year.

There has been some falling off in the orders received from Paris at the Haute-Marne works, but those received from the provinces present some increase. Rolled iron from coke-made pig has been well sustained in the Haute-Marne at 8l. to 8l. 8s. per ton; ditto, from mixed pig, at 8l. 12s. to 8l. 16s. per ton; and ditto, from charcoal-made pig, 8l. 12s. to 9l. per ton, according to the works, with a bonification of 4s. per ton, according to the importance of the contracts concluded. Hammered irons are held at 9l. 12s. to 10l. per ton; and machine, No. 20, at 9l. to 9l. 4s. per ton. The Moselle is now sending so great a quantity of minerals into Belgium and Prussia that the Eastern of France Railway Company, finding its own plant insufficient, has been obliged to borrow 400 trucks from the Northern of France Railway Company; these trucks are devoted specially to mineral traffic. Prussia has declined an order for 3000 tons of rails, proposed by the Guillaume-Luxembourg Railway, on the plea that its production is engaged for two years in advance. MM. de Wendel and Sons have accepted the contract on the terms of their last contract with the Eastern of France Railway Company. MM. Dupont and Dreyfus are constructing 12 new puddling-furnaces on an old system. The Montataire Forges Company is about to establish puddling apparatus at Frouard. Considerable contracts for pig are understood to have been concluded in the Moselle at 2l. 16s. 10d. per ton; a considerable demand for iron also prevails in the same district, and the rolling-mills producing rails are fully employed. It is even affirmed that the Anzin Works have engaged their production until 1872, and that, too, with a notable advance in prices. The Vezin Aulnoye Company is completing the equipment of its Hautmont Works, and almost all the puddling-furnaces have now been brought into operation. A want of labour is experienced in the Nord, and one establishment in order to fulfil its engagements has been obliged to import some puddled bars. The activity which prevails in the Paris building trade tends to maintain a firm tone also for various descriptions of iron in the great city; merchants' iron is quoted currently at 8l. 16s. to 9l. per ton. MM. Mazeline are equipping a new rolling-mill for iron and plates at Alfort, near Paris; this rolling-mill will be in operation in a few months.

Copper has been somewhat firmer of late upon the principal markets. At Havre, Chilian, in bars, has made 69l. 12s. to 70l. per ton; refined ditto, in ingots, 78l. per ton; Peruvian minerals (pure standard), 72l. to 74l. per ton; United States (Baltimore), 78l. to 80l. per ton; Lake Superior, 88l. to 90l.; Mexican and Plata, in bars, 68l.; old yellow copper, 44l. to 48l.; red ditto, 66l. to 70l.; bronze ditto, 66l. to 70l. per ton. Tin has also displayed upward tendencies; a slight advance has been attempted upon some markets, but it is doubtful whether it will be sustained by the actual requirements of consumption. At Havre, Banca has made 114l. to 117l.; Straits, 130l. to 140l. per ton; and Peruvian, 100l. to 104l. per ton. At Rotterdam, Banca has been quoted at 78 fls. to 78½ fls.; and Billiton, 76 fls. to 76½ fls. There has been rather a better demand for lead, and prices have been well supported. A similar report may be made with regard to zinc. At Paris rough Silesian has made 21l. 16s. per ton.

FOREIGN MINES.

TAQUARIL (Gold).—Mr. T. S. Treloar, under date June 15, advises, *via* Liverpool, that the operations generally at the mine have been prosecuted with great vigour and spirit. He further states that he is in possession of the company's title deeds, and that the necessary measures for taking "posse judicial" of the property are being adopted. And Messrs. John Moore and Co., the company's agents at Rio, under date July 2, writes as follows:—"We now beg to hand you herewith copy of Mr. T. S. Treloar's letter of June 21, advising that 'judicial possession' of the company's property was taken in the proper and legal form on the 19th idem."

EL CHICO.—J. R. Rule, June 28: We finished clearing the El Torno shaft to bottom on the 21st—45 varas in ten weeks. The stones we have broken at the bottom are of the same class as this vein has shown generally, and I shall have some samples assayed. We shall now clear the level running westward from the end of the shaft. We are about to receive supplies of ore for reduction at the hacienda of San Pascual from a mine lately opened in the Pachuca district, at the price of $85 per monton. There is a good prospect of considerable custom from this quarter.

UNITED MEXICAN.—Guanaxuato, June 23: Regarding our mines, the month's news, on the whole, is favourable.—Mine of Jesus Maria y Jose: Some buscone works having improved our sales have gone up to $1991 on June 10, and to $2177 on June 17. The expectations for the present week are also good. In the hacienda workings the frente de San Modesto, north in the planes (deepest workings) has also improved, and is in fair ore 3 varas broad, making northwards and downwards, so that in this mine our prospects are much better than they were last month. The reserves are being worked on with much care, and the attle (rubbish) from the Remedios workings has assisted us much in filling up and securing our loose ground. In some places the mine was very dangerous, but during the last two months much has been done towards rendering it more secure. The accounts for May show a loss of $2793. For June they will be better, as we already have a raspa in from Dolores worth, free of duties, about $5200, and the increase in the buscone sales will tell for the entire month of five weeks.—Mine of Remedios: The intelligence regarding this mine is, unfortunately, not so good as that of Jesus Maria. The two frentes of Santo Domingo and Santa Elena are much fallen off. San Eligio continues in good ore, but, of course, owing to the decline in the other two frentes, our extraction of ore is much diminished. The sales have been on June 10, $1127, and on June 17, $1374. On the first quarter's operations in this mine we have realised a profit of $1646 for the company, without including the ore on hand in the haciendas. —New Concern—Adit of San Cayetano: The rock in the adit is not quite so hard as it was last month, and it blasts better, so that I really hope we shall advance more rapidly. The whole distance driven in May was 2¼ varas.—Mines of Buenos Ayres: In the shaft we are getting down fast, and on June 19 we reached metres 74·70, and we have nothing new to record, except that a small narrow strip of ore of no value was cut at the beginning of the month.—Mine of San Antonio: In the shaft the rock is harder than in Buenos Ayres, and on June 19 we had reached metres 100·85 depth. We were also thrown back in the month by having to timber a portion of the old works.

IMPERIAL SILVER QUARRIES.—June 28: During last week there was 11 feet of tunnel made.

— July 1: There was 40 ft. of tunnel made, and 18 ft. substantially timbered, in the month of June. At the risk of creating expectations which the event may doom to disappointment, it is my duty to report that on Saturday afternoon a blast in the upper part of the tunnel revealed rock carrying sulphurets of the baser metals, an indication, I think, that I am about to penetrate the outer crust of the casing of the Triumph ledge; and I do so, first, because such an appearance is usual here before striking a ledge; secondly, because I have seen sulphurets for the first time in our tunnel; and, thirdly, because they made their appearance just where I should look for the ledge first—in the roof—the ledge pitching away from us. I cannot see further into the rock than you can, but there can be no harm in giving you my opinion, even if it should turn out to be wrong. If I am right in my conjecture you will be in possession of my telegram ere this report can reach you. If I am wrong, you must not be disappointed.

— July 5: Last week there was 10 ft. of tunnel made. We are now in 980 ft.

MARIQUITA.—Santa Ana: The superintendent writes under date May 31:—Cost and Returns for May: Although not yet made up formally, I can state them pretty nearly. Our actual cost will be about $6700, our actual returns by amalgamation $3600, showing a deficit of $3100. This, however, by no means represents our true position, as I have purposely suspended reduction operations for some days, in order to be enabled to treat the ores more economically and advantageously. Had I continued amalgamating until the end of the month the cost and returns would have been $7075 and $5400. Had we the means for treating all our ores, I could have shown a profit ever since we got the wire-rope to work.—Marmato Mines for the Month of May: Cost, $9553; and returns, $10,270.—Aguas Claras for the Month of May: Cost, $2540; and returns, $3631.

ANGLO-ARGENTINE.—Mr. Barnard, under date May 25, writes—Gualilan: A road has been made almost throughout the length of the property, and is being continued southwards, and in the direction of San Juan. A small spring of fair water, about one mile distant from the house, has been much increased by excavation. A quantity of stone, of excellent quality for building, has been raised, and the receipt of plan of engine-house enables Captain Vivian to fix the exact site of the shaft. Sufficient timber has arrived, and it will be commenced to-morrow by two miners. As many labourers as can be put on the ground will commence clearing the site of engine-house to-morrow. Some of the ground has already been cleared.

CAPE COPPER.—John Williams, Ookiep, June 4: The shaftmen during the past month have finished dividing and casing the whim-shaft from the 30 to the 40, and stoping down a piece of ground that was left for a pent-house in the whim-shaft for the safety of the men, to work under which caused a delay a little over a week in putting in the skip-road; it is now completed, and works very satisfactorily. We shall now commence sinking the engine-shaft and cutting a tip-plat below the 40, by three men and six labourers, at 20l. per cubic fathom, for 4 fms., or the month. The 40, east from No. 4 winze, during the past month, has been extended 4 ft. in very hard, troublesome granite rock; we have about 3 fms. more to drive to communicate with the end being driven west from the engine-shaft, by six native labourers, directed by the shaftmen, at 30l. per fathom for the month, or hole. In the 30 west, and the 30 south-west from engine-shaft, there has been nothing done during the past month, in consequence of not being able to haul the stuff while the skip-road was putting in, and the same remarks will apply to the stope in back of the 30 and bottom of the 20. We have commenced dressing the accumulated stuff, and shall resume working these bargains again as soon as possible. We have set the 30 to drive south on the flookan course to intersect Job's branch about 16 fms. in advance by two men and two labourers, at 8l. per fm. for 5 fms., or the month; at present this end will yield about 4 tons of copper ore per fm. The 20 east has been extended during the past month 2 fms. 1 ft. 8 in. on Job's branch, through ore ground that has produced about 3 tons of copper ore per fathom, its present yield being about the same, and is very promising for further improvement; re-set June 1 to two men and two labourers, at 10l. per fm. for 4 fms., or the month. The 20 east, on a south branch, or part of the south mineral course, has been extended east from the flookan course during the past month 2 fms. 3 ft. 7 in through ground that has produced some good stones of copper ore, and it has a very kindly appearance; re-set June 1 to two men and two labourers, at 14l. per fathom for 3 fms., or the month. The stopes in bottom of the 20, from No. 3 winze, will yield about 8 tons of copper ore per fm.; re-set June 1 to two men and eight labourers, at 30s. per fm. for 40 fms., or the month. We intend sinking a winze in bottom of the 20 south-west from the incline, about 12 fms. in advance of the 30, as soon as we have a sufficient number of hands, where there is a splendid course of copper ore to commence sinking in. We are driving and stoping the 20 south-west from the incline, also the 20 north-east, by 24 men, native labourers on day wages, who are directed by two English miners. Each stope will yield about 7 or 8 tons of copper ore per fathom. The number of English miners we have here is not enough to carry on all the points that ought to be in operation, so as to open up the mine expeditiously and economically. May extract, 500 tons of copper of 21 cwts., or 525 tons of 2240 lbs.; average per cent., 32·1.—Transport to the coast: Copper ore from Ookiep, 209 tons; and from Spectakel, 67 tons; from Springbok, 15 tons of regulus and metal. Sales of ore since last report—198 tons, at 13s. 7d. per unit, and 46 tons at 13s. 9d. per unit, both by public ticket, and 530 tons, at 13s. 9d. per unit, by private contract.

ALAMILLOS.—July 21: The lode in the 4th level, driving west from San Rafael shaft, is of a good appearance, yielding ¾ ton of ore per fathom. The 4th level, east of La Magdalena shaft, is worth ½ ton of ore per fathom. In the 5th level, east of above shaft, the lode is small and poor; and in the 5th level, west of above shaft, the lode is poor and the ground hard. The 5th level, east of Taylor's engine-shaft, is on the point of being holed. The lode in the 6th level, east of Taylor's, is large, and spotted with lead, but does not contain enough to value. The ground in the 5th level, west of Taylor's shaft, is easy, and the lode vughy, with occasional stones of ore. The 6th level, west of Taylor's, yields ½ ton of ore per fathom; the lode has declined in value during the past week. The lode in the 5th level, east of San Adriano shaft, also yields ½ ton of ore per fathom; the lode is well-defined, producing good stones of ore. The lode in the 4th level, west of San Adriano shaft, is unproductive. The lode in the 3d level, west of San Yap shaft, is very regular, but poor. The 2d level, east of Cox's shaft, is worth ¾ ton of ore per fathom; the lode is large, and of a good appearance. The 3d level, east of Crosby's cross-cut, yields 1 ton of ore per fathom; the ground is favourable for driving, with a good looking lode. The lode in the 3d level, west of Crosby's cross-cut, has improved, and is now worth 1 ton of ore per fathom; the ground, too, has become much easier. The 2d level, west of Morris's shaft, produces 1 ton of ore per fathom; this is opening good tribute ground.—Shafts and Winzes: The lode in San Victor shaft is very regular, yielding 1 ton of ore per fathom. Pablo's winze, which has reached the depth required, produces ½ ton per fathom. The lode in Sanchy's winze, below the 3d level, is small at present, yielding ½ ton of ore per fathom. Mateo's winze, below the 5th level, is also worth ½ ton of ore per fathom; this is being sunk in advance of the 6th level, west from Taylor's engine-shaft.

CAPULA.—Capt. Paull, Capula, June 27: The net proceeds from the silver (266½ marcs, or 2132 ozs.) of torta No. 4 amounted to $2387·11. Torta No. 5 of 15 montones was washed on the 25th, and produced 297 marcs (2376 ozs.) of silver, which we shall send to Mexico by the next conducta, which no doubt will leave on Tuesday or Wednesday next. We finished sending the 150 cargas for torta No. 6 on the 16th inst. On the 17th we sent 9 cargas for torta No. 7, when I discovered that the carriers were robbing the metal—that is, they were changing the metal on the road for depetate (attle). I dismissed them the same day, and have given the company's mules a few days rest, which they very much require. I am now trying to get other carriers, that I may send 50 cargas at a time, and an Englishmen to go with them to prevent them from stealing. There is sufficient metal in the ore yard for the torta, and from the mine assay is of better ley than the last two tortas. We are short of funds for carrying on the works in San Juan hacienda. There has been some very heavy floods this month, but the walls by the river have stood, notwithstanding the mortar in the part last built was quite fresh; the wall across the river is 6 ft. thick in the bottom, and 4 ft. thick, now 9 varas high; we still have to go 5 varas higher.—Mine: The engine-shaft is down to the depth, and will be squared next week; so that on the following week we shall commence driving a cross-cut north to intersect the main lode. There are still several branches of quartz in the shaft, all of which contain threads of very pretty blue ore, but some of the threads are fully 1 inch wide. Nothing has been done in San Miguel winze, under San Jorge, since my last, and they only worked four days in Guadalupe winze, on account of water, which we think will be completely drained as soon as the main lode is cut by the cross-cut north of shaft. In San Jorge rise and stopes the lode or the orey parts are very variable, but throughout the month there is very little alteration; if any, it is for the better. We have certainly had more bags of best ore this fortnight than for some time before. The mine altogether is looking well.

FORTUNA.—July 30: Canada Incosa Mine: The 110, west of O'Shea's shaft, is holed to Prueba's winze; the lode is split into small branches, yielding ½ ton of ore per fathom. The 100, west of Henty's shaft, also produces ½ ton of ore per fathom; this end is passing through a hard bar of ground; we hope to get through it shortly, when probably we shall find the lode again productive. The lode in the 90, west of Judd's shaft, is worth 1 ton of ore per fathom; the ground is favourable for driving. In the 90, east of Addis's shaft, the lode is large, composed of sulphate of lime, with stones of ore. The ground in the 80, south of Henty's shaft, is a little more favourable than it has been. The 50, east of San Pedro shaft, yields 1½ ton of ore per fathom; the lode here has improved in value since last report, and is opening good tribute ground. In the 80, west of Lowndes' shaft, no change has taken place since our last. The 80, east of Lowndes' shaft, is worth 1 ton of ore per fathom; the lode is looking better, and we expect a further improvement. The 70, east of Carro's shaft, yields 1¼ ton per fathom; the men are making good progress in this end, and the lode is opening out well.—Shafts and Winzes: In O'Shea's shaft, below the 110, we have put a larger bucket-lift in the 110, which has taken up all the water from the level; consequently, we are now getting on better with the sinking. Henty's shaft is deep enough for the 110, and the men have commenced to cross-cut towards the lode. Good progress is being made with Alc's winze, sinking below the 55; the lode is small.—Los Salidos Mine: The 90, west of Buenos Amigos shaft, is worth 3 tons of ore per fathom; this end is passing through a splendid piece of ore ground. The lode in the 75, west of San Carlos shaft, is kindly, but not quite so valuable as it has been; it now yields 1¼ ton of ore per fathom. The 100, east of San Gabriel shaft, produces ¾ ton of ore per fathom; the lode here has improved during the last few days. The 90, east of Cox's shaft, is worth 2½ tons of ore per fathom; the lode is divided into two compact and solid branches. The 75, east of San Pablos shaft, yields 1½ ton of ore per fathom; this has fallen off in value since last report, but is still opening valuable tribute ground.—Shafts and Winzes: Buenos Amigos shaft, sinking below the 90, yields 1 ton of ore per fathom; this shaft is now down to the required depth for the 100, and the men are put to drive east and west of same; each end has a kindly lode, worth 1½ ton per fathom. San Pablos shaft, below the 75, is worth 3 tons per fathom, and the lode is still looking well, but rather difficult for sinking. Colon's winze is also down to the required depth of the 100, and the men are put to drive west to meet the end east from Buenos Amigos shaft; the lode has improved, and is now worth 1 ton of ore per fathom. The men are getting on well with Sagasta's winze below the 90. Morris's engine-shaft produces ¾ ton of ore per fathom; two new main lodes taken down since last report. We have commenced sinking San Miguel shaft below the 65 on the branch that branches north of the main part of the lode.

LINARES.—July 21: West of Engine-Shaft: The lode in the 85, driving west of Warne's engine-shaft, is large and strong, but quite unproductive. The 45, east of San Francisco shaft, yields 1 ton of ore per fathom. The lode is declining both in size and value. The lode in the 31, east of San Francisco shaft, consists of quartz and lead ore, producing of the latter 1 ton per fathom. The ground in the 25, east of the above shaft, is hard for driving.—Shafts and Winzes: In sinking San Francisco shaft below the 45, favourable progress is being made. No. 167 winze, below the 45, is worth 2 tons of ore per fathom; the ground is [illegible] during the past week, but is again improving, and looking very kindly. No. 168 winze, below the 75, [illegible] ton of ore per fathom. [illegible]—Los Quinientos Mine: The lode in the 45, driving west of Taylor's engine-shaft, is small and unproductive. The 45, east of Taylor's shaft, produces 2 tons of ore per fathom; the lode is improving, and the ground is getting easier for driving. The 32, east of Taylor's shaft, is opening out fairly productive ground, worth 1 ton of ore per fathom. In the 32, west of Taylor's shaft, and in the 32, east of Cox's shaft, the lode is quite unproductive, and the ground much harder for driving than it was; the holing has consequently been delayed. The 32, west of Cox's shaft, is idle, awaiting the communication alluded to above. San Carlos shaft will be completed to the requisite depth for a 32 fm. level in a few days, when the men will immediately cross-cut south towards the lode.

LUSITANIAN.—July 20: In sinking Taylor's engine-shaft below the 130 the lode in the shaft is worth 2 tons of ore per fathom. In sinking the River shaft below the 100 the lode is 2 ft. wide, composed of flookan and quartz. In sinking No. 78 winze below the 8, west of Perez shaft, on branch, the lode is 6 in. wide, composed of flookan and country. In the 130, east of Taylor's level, on Basto's lode, the lode is 2¼ ft. wide, composed of quartz and country. In the stoping above the 120, east of No. 77 winze, the lode is worth 1 ton per fm. In the 130, west of Taylor's, the lode is worth ½ ton per fathom. In the stoping above the 120, west of No. 77 winze, the lode is worth 4 tons per fathom. In the 120, east of Taylor's, the lode is worth ½ ton of ore per fathom. In the 120, west of ditto, the lode is 1½ ft. wide, composed of quartz and stones of mundic. In the 110, east of Taylor's, the lode is 3 ft. wide, composed of quartz and stones of ore. In the 110, west of ditto, the lode is 1 ft. wide, composed of quartz and stones of mundic. In the 90, east of River shaft, the lode is 1¼ ft. wide, composed of dry flookan. In the 70 east the lode is 1½ ft. wide, composed of quartz and country. In the 18, west of cross-cut, west of Perez shaft, the lode is worth 1 ton per fm. In the 18, east of cross-cut, west of Perez shaft, the lode is worth ¾ ton per fm. In the 8, west of Perez shaft, the lode is worth ½ ton per fm. In the adit level, west of Perez' shaft, the lode is 6 in. wide, worth ⅓ ton per fathom. In the 28 fm. level, west of cross-cut, the lode is 1½ ft. wide, and worth 1 ton of ore per fathom. The 28 cross-cut south is suspended.—Carvalhal: The ground in the 50 fm. level cross-cut, south of incline shaft, is a hard gneiss. In the rise above the 40, east of incline shaft, the lode is worth 1 ton per fathom for blende. In taking down the great lode we find the lode to be worth 2 tons of lead per fathom. In the 40 fm. level, east of incline shaft, the lode is worth 1¼ ton per fathom for lead and blende together. In the 30, east of ditto, the lode is 1½ ft. wide, composed of quartz. In the 20 east the lode is 1 ft. wide, composed of quartz and country. In the 10 east the lode is 3 ft. wide, composed of quartz and lead, worth ½ ton per fathom. In the adit level, west of incline shaft, on caunter lode, the lode is 6 in. wide, producing stones of lead. In the 10 fm. level the lode is 1 ft. wide, composed of quartz and country.

WEST CANADA.—F. Williams, July 13: Huron Copper Bay: The stope in the bottom of the 20 fm. level, east of Stephens's winze, yields 2 tons of ore per fathom. The stope in the bottom of the 20 west yields 3 tons of ore per fathom. The stope in the bottom of the 20, east of Palmer's, yields 3 tons. The stope in the bottom of the 35 yields over 2½ tons of ore per fathom. We expect that the piece of ground between this stope and Bray's shaft will prove valuable. The stope in the bottom of the 20, east and west of Powell's winze, on the Fire lode, yields 2 tons of ore per fathom. I am sorry to say that the ore ground in this stope is getting very short as we approach the 35, and according to the present appearance this stope cannot last more than four or five months more. The stope over the 35 fathom level, east of Bray's engine-shaft, yields 2½ tons of ore per fathom. Bartle's winzemen are engaged in stoping down a piece of side to the west of the winze, which yields a fair quantity of ore as we get near the bottom of the level.—Wellington Mine: The stope east of Rowe's shaft is turning out well, and at present yields over 3 tons of ore per fathom. The stope west of this shaft is worth 2¼ tons of ore per fathom. Everything connected with the mine is progressing satisfactorily.

Mr. W. L. WEBB, of No. 8, Finch Lane, in his "Circular List," of July 28, under the head "Foreign Mines," says:—

THE LUCY PHILLIPS GOLD AND SILVER MINING COMPANY (Limited).—The shareholders by this time must have become, I should think, utterly confused, if they have taken the trouble to read the numerous circulars sent to them relative to this company lately—in fact, I should not be unprepared to hear that for the most part those emanations have been consigned to the waste paper basket; but supposing this list should fall into the hands of any who have waded through the mass of printed matter referred to without becoming bewildered, I would ask them whether they do not think that the directors, who have paid for and hold between 5000l. and 6000l. of the stock of the company, are not much more likely to advise the shareholders for their good than some of those who have lately addressed them, and who have never contributed one farthing to its real capital, although they have admitted making large sums of money out of the company by the sale of vendors' shares. Ever since July last, directly and indirectly, efforts have been made to impede, stultify, and frustrate every act done or recommended by the directors for the good of the company "by persons who ought to have known better." And the circulars alluded to have, by misstatement, endeavoured to produce a want of confidence in the board, by making it appear that the directors were themselves stopping the way. The advice I have given to the shareholders from the first I again repeat, feeling sure that the only safe and right way for them to adopt is to support strenuously and energetically the directors, who have so large and real a stake in the company, who can have only one object in view—that of doing their best to recover their own and the shareholders losses, and in this perilous moment of its affairs, show that they recognise their efforts and labours to preserve them from further losses, and follow them in the path they point out to recover those of the past.

THE GOLD MINING COMPANY OF YUBA (Limited).—This Company (*vide* prospectus), has been started under the auspices of some of the largest and oldest shareholders of the Lucy Phillips Gold and Silver Mining Company (Limited). Dr. Bishop's report as to the value of the "Minerva," (the property proposed to be bought) as that was bought, and is working, and after having examined and tested its quartz, on the spot, more or less over a period of 12 months, is so conclusive and positive, and knowing Dr. Bishop so well, I do not hesitate to promote the interests of this company to the best of my power. And I would suggest to all those who wish an allotment of shares to make early application, as the list will soon be closed. It will be seen that for 14,000l. only a mine has been offered (real and well tried), with all requisite machinery at hand. Whilst for the Lucy Phillips Mine (which has so far proved valueless), shares representing 60,000l. were paid, and the machinery (now lying idle) has cost some 16,000l. more. In other words, a good and well tried property, and sufficient machinery to work it, is offered for 14,000l., against the so far worthless Lucy Phillips and its machinery, which has cost in shares and cash some 76,000l., and seeking now to raise 15,000l. or 20,000l. more. It must, therefore, be self-evident that the Yuba Company is offered in good faith, and with the earnest desire not to profit vendors or promoters, but really and truly to afford an opportunity for the shareholders of the Lucy Phillips Company to retrieve their losses, a preference allotment having been promised to them if they apply in time—by August 4, inst.

The following extract taken from the *Idaho Statesman*, of June 1, pays a handsome compliment to Dr. Bishop, which I have great pleasure in reproducing here, having made use of his name in connection with the above company:—

"DR. BISHOP.—We mentioned casually in our Saturday's issue the departure of Dr. Bishop for the East. Dr. Bishop came amongst us last August as the agent of the Lucy Phillips Mining Company. Had his company sent him out two years ago, instead of the incompetent individual who represented them, the difficulties which they have encountered never would have arisen. Dr. Bishop during his sojourn in Boise, familiarised himself thoroughly with the territorial mining laws and the customs of mining camps. He made himself well acquainted with the numerous varieties of quartz, and the art of working lodes to the best advantage. Added to his general scientific knowledge, he possesses a shrewdness and tact for business rarely seen in professional men. We can safely say to our English friends on the other side of the water, that if they always selected their agents with the same judgment they displayed in appointing our friend, they would run no risk of being sold by our mountain sharps."

THE COAL TRADE IN AMERICA.—The board of managers of the Lehigh Coal and Navigation Company has presented an elaborate and highly interesting report for 1868. The profits of the year from all sources were $1,156,083·90, and deducting therefrom the general expenses, balance of interest account, and loss on Delaware Division Canal, together $1,149,091·35, there remains a net surplus to credit of profit and loss account of $6992·55. The production of the company's mines was 453,821 tons 12 cwts. in 1868, against 389,408 tons 2 cwts. in the preceding year. The results of the business of the past year give good grounds to hope for an early resumption of dividends on the stock, as the profits were realised almost entirely after Aug. 1, and the revenue of five months paid the interest charge of twelve months. At the commencement of the season arrangements were made with prominent coal houses in Philadelphia and New York for the sale to them, at monthly prices, of all the company's production of coal beyond the amount sold directly to consumers. The arrangement proved a good one, and perhaps the best attainable at the time, and the mines were fully worked during the season, with a certainty of a market for their product. The managers desire in the future to sell their coal through the company's own agents, instead of through commission houses, and to accomplish this arrangements have been made to secure an office in New York early the coming season, and Mr. W. H. Tillinghast, treasurer of the Wilkesbarre Coal and Iron Company, has been appointed selling agent in that market. It is their desire and expectation to take shortly the prominent position among coal companies that the quantity and quality of their coal entitle them to. Their own product, added to that of the Wilkesbarre Coal and Iron Company, amounted during the year to 865,502·11 tons, and an increase of 25 per cent. is expected in 1869. For the portion of their coal that goes to the New York market by rail favourable transport arrangements have been made with the three New Jersey companies. A contract was entered into with the Morris and Essex Railroad Company in September last, by which that company granted satisfactory terms for transportation, and agreed to give them the exclusive use of a new pier, then in the course of construction at Hoboken, and also to put into the trade 1000 coal cars. They have since taken possession of the wharf, and many of the coal cars are now running between Wilkesbarre and Hoboken. The nearness to market of their own coal, and its superior quality, will enable them at all times to compete on favourable terms, on the line and in New York, with the product of other regions, and this contract enables them to put the Wilkesbarre Coal and Iron Company's coal in New York market on terms as favourable as those secured by the three large northern coal companies, and guarantees them the necessary facilities for transportation after August next, when the planes are rebuilt. No accurate survey or geological examination having heretofore been made of the company's property in Panther Creek valley, the managers engaged in April last the services of Mr. R. P. Rothwell, a mining engineer of high reputation, to make a critical examination, survey, and report. Mr. Rothwell's report is made in a masterly manner, being indeed a complete treatise upon the coal deposits of the district, and the care and detail with which the maps and sections have been drawn cannot fail to make them of great practical utility to those engaged in the working of the mines.

A CURIOUS CALCULATION.—A miner named Bennett Opie, Wheal Basset, in the parish of Illogan, enters into the following calculation. He has been labouring underground 50 years, at an average depth of 130 fms., so that in ascending and descending he has climbed 260 fms. per day, which for 50 years amount to 2,704,000 fms., or 3072 miles.

London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—July 31, 1869.